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Wisconsin Department of Commerce

**Safety & Buildings Division**
**201 West Washington Avenue**
**P.O. Box 2658**
**Madison, WI 53701-2658**

Evaluation #

New Product # 20069014
Replaces # 200614-I Revised
Previously Replaced # (Replaces 200077-I)

# Wisconsin
# Building Products Evaluation

| | |
|---|---|
| Material | Thermax Insulation Board |
| Manufacturer | Dow Chemical Company<br>1605 Joseph Drive, 200 Larkin<br>Midland, MI 48674 |

**SCOPE OF EVALUATION**

**GENERAL:** The Thermax Insulation Board (TF-600, TF-600MB, TF-600S, TF-604, TF-610, TF-665 and TF-610C), manufactured by Dow Chemical Company were evaluated for use as foam plastic insulation.

The **Comm** requirements below in accordance with the current **Wisconsin Uniform Dwelling Code for 1- and 2-family dwellings:**

- **Building Product Approval:** The Thermax Insulation Board (TF-600, TF-600MB, TF-600S, TF-604, TF-610, TF-665 and TF-610C), were evaluated in accordance with **s. Comm 20.18.**
- **Foam Plastic:** The Thermax Insulation Board (TF-600, TF-600MB, TF-600S, TF-604, TF-610, TF-665 and TF-610C), were evaluated in accordance with the foam plastic requirements of **s. Comm 21.11.**

## DESCRIPTION AND USE

Thermax Insulation Board (Pentane product) uses pentane and isopropyl blowing agents.

Thermax Insulation Board products are available in a variety of finishes and thickness as described below.

| Insulation Board Designation | Top Facer/Bottom Facer |
|---|---|
| Thermax (TF610) Insulation Board, Plain Factory Finish (Thermax Sheathing) | A/A |
| Thermax (TF600S) Insulation Board, White Finish or Thermax Ag-Therm | D/A |
| Thermax (TF600MB) Metal Building Board | C/C |
| Thermax (TF600) Insulation Board, Embossed Finish or Light Duty (LD) | D/C |
| Thermax (TF604) Insulation Board, Heavy Duty Embossed Finish or Heavy Duty (HD) | E/C |
| Thermax (TF665) Plus Liner Board or Heavy Duty Plus | F & A/A |
| Thermax (TF610C) Insulation Board, Cavity Wall Insulation | A, C or D/A |

A = 0.0009 in. (0.023 mm) thick aluminum foil with tinted epoxy or acrylic wash coat on the reverse side.
C = 0.00125 in. (0.03 mm) thick embossed aluminum foil with tinted epoxy or acrylic wash coat on the reverse side.
D = 0.00125 in. (0.03 mm) thick embossed aluminum foil with white cross-linked acrylic or epoxy coating on the exposed side and tinted epoxy or acrylic wash coat on the reverse side.
E = 0.004 in. (0.1 mm) thick embossed aluminum foil with cross-linked acrylic or epoxy coating on the exposed side and tinted epoxy or acrylic wash coat on the reverse side.
F = 0.016 in. (0.41 mm) thick embossed aluminum sheet with white polyester top coat on the exposed side and wash coat on the reverse side.

Thermax Insulation Board products are available in standard 16, 24 and 48 inch widths and various lengths. The polyisocyanurate foam core is reinforced with proprietary glass fibers and has an approximate density of 2 pcf.

## TESTS AND RESULTS

Testing to Factory Mutual Research corp. (FMRC) standard FM 4880 showed that Thermax Insulation Board without a thermal barrier will not contribute to the spread of fire and will remain in place on walls and ceilings for 15 minutes in a full scale fire test. The flame spread and smoke developed rating for the boards was determined in accordance with ASTM E84: Flame Spread ≤ 25, and Smoke Development 250.

Fire testing was conducted by Underwriters Laboratory for the 1-hour and 2-hour fire walls using Thermax Insulation Board. These designs are UL #355, UL #354, UL #902 and others which can be located at www.ul.com.

**Thermal Resistance of Thermax Insulation Board:** The stabilized thermal resistance values (R-values) of these products are shown in the following table.

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|---|---|---|---|---|---|---|
| Nominal Thickness | ½” | ¾” | 1” | 1/1/4” | 1-1/2” | 1-3/4” |
| R-Value at 75° F Mean Temperature | 3.3 | 5 | 6.5 | 8 | 9.8 | 11.4 |
| Nominal Thickness | 2.0” | 2-1/2” | 3.0” | 3-1/2” | 4.0” | 4-1/4” |
| R-Value at 75° F Mean Temperature | 13 | 15.8 | 19 | 22.1 | 25.3 | 26.9 |

Testing was also conducted by RADCO Resources, Applications, Designs and Controls, Inc., Listing and Testing Division, 3220 E. 59th St., Long Beach, CA 90805, Test Report Number RAD-2989, Project No. C-8234 includes:

- COMPRESSIVE STRENGTH TEST per ASTM C1289 (SECTION 11.3) and ASTM D1621 on 1" THERMAX material using PENTANE and ISOPROPYL blowing agents.
- DIMENSIONAL STABILITY TEST per ASTM C1289 (SECTION 11.4) and ASTM D2126 (158° F and 95% R.H. / 200° F and ambient R.H. / -40° F and ambient R.H.) on 1" THERMAX material using PENTANE and ISOPROPYL blowing agents.
- FLEXURAL STRENGTH TEST per ASTM C1289 (SECTION 11.5) and ASTM C203 (METHOD 1, PROCEDURE B) on 1" THERMAX material using PENTANE and ISOPROPYL blowing agents.
- TENSILE STRENGTH PERPENDICULAR TO BOARD SURFACE TEST per ASTM C1289 (SECTION 11.6) and ASTM C209 (SECTION 13) on 1" THERMAX material using PENTANE and ISOPROPYL blowing agents.
- WATER ABSORPTION TEST per ASTM C1289 (SECTION 11.7) and ASTM C209 (SECTION 14) on 1" THERMAX material using PENTANE and ISOPROPYL blowing agents.
- WATER VAPOR TRANSMISSION TEST per ASTM C1289 (SECTION 11.8) and ASTM E96 (SECTION 11 DESICCANT METHOD) on 1" THERMAX material using PENTANE and ISOPROPYL blowing agents.n
- THERMAL RESISTANCE TEST (HEAT FLOW METER) per ASTM C1289 (SECTION 11.2) and ASTM C518 on 1" THERMAX material using PENTANE and ISOPROPYL blowing agents. **R-value on the PENTANE product is 7.95/1.178-inch = 6.75. This R-value of 6.75/inch is linear up to and including 2.0-inches. At thickness above 2.0-inches a slight drop in R-value of approx. 0.15 to 0.20 which is the reason why the R-values are not linear at 6.5/inch.**

**Identification:** All boards and/or packaging labels are identified by the product name, R-value and the appropriate Underwriters Laboratories and Factory Mutual labels indicating compliance testing.

## LIMITATIONS OF APPROVAL

The **Comm** limitations below are in accordance with the current **Wisconsin Uniform Dwelling Code for 1- and 2-family dwellings:**

- **Building Product Approval:** The Thermax Insulation Board (TF-600, TF-600MB, TF-600S, TF-604, TF-610, TF-665 and TF-610C), were evaluated in accordance with **s. Comm 20.18** for use without a thermal barrier.
- **Foam Plastic:** The Thermax Insulation Board (TF-600, TF-600MB, TF-600S, TF-604, TF-610, TF-665 and TF-610C), were evaluated in accordance with the foam plastic requirements of **s. Comm 21.11** for use without a thermal barrier.

1. Thermax Insulation Board may be installed where combustible materials are permitted as follows:

   All boards may be installed within or installed against the interior side of exterior facing of combustible exterior walls. It may also be sandwiched between structural purlins or girts and metal skins or installed as a nonstructural sheathing on frame construction. Attic spaces created by these materials must be vented to the outside for pressure relief purposes relating to temperature variations. **The insulation board is not required to be covered or, protected but may be covered with combustible material to provide protection from damage.**

   Thermax Insulation Board must be secured at each supporting element with suitable fasteners such as galvanized roofing nails with 3/8-inch head, 1/4-inch stove bolts with 1 1/2-inch steel washers, or self-tapping screws spaced 12 inches on center across the board width. The board must be continuous over at least three framing members and have a minimum of two full spans.
   Installation in combustible, unoccupied attics and crawl spaces without further protection is permitted.

2. Thermax Insulation Board may be installed where noncombustible materials are required as follows:

   All boards mat be installed within or installed against the interior side of exterior facing of noncombustible exterior, nonbearing walls not required to be of fire-resistive construction without affecting the noncombustible recognition. **Installation on interior wall or ceiling surfaces of noncombustible construction is permitted without a 15-minute thermal barrier.** This is contingent on the board not being used for structural purposes.

3. The boards may be used under FMRC (Factory Mutual Research Corporation) approved standing seam metal roofs with the underside of the insulation exposed to the interior of the building. The insulation boards may be installed between the metal roof and the structural frame-work of the building or below the structural frame work of the building.

4. In all installations, the aluminum foil facings of Thermax Insulation Boards must be positively secured to the foam core by: 1) secure the entire board assembly to supporting structural members with mechanical fasteners, or 2) positive securing of the interior board facer to the exterior board facer with mechanical fasteners.

5. In all installations, the integrity of the aluminum foil facings of Thermax Insulation Boards must be maintained (except for reasonable surface fractures which result from normal use or during construction) so that the isocyanurate foam core is not left exposed.

This approval will be valid through December 31, 2011, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The product approval is applicable to projects approved under the current edition of the applicable codes. This approval may be void for project approvals made under future applicable editions. The Wisconsin Building Product Evaluation number must be provided when plans that include this product are submitted for review.

**DISCLAIMER**

The department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement not specified in this document.

Revision Date: December 12, 2006
Approval Date: November 13, 2006 By: _____

Lee E. Finley, Jr.
Product & Material Review
Integrated Services Bureau

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